Eurasian Intermodal Supply Chains

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A Dynamic Systems Approach

By

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Trade and economic crises are everywhere in the world right now, however, new seeds of growth are already sown and growing in Eurasia.

CONTENTS

PREFACE

The world is simultaneously a “big place” and a “small one”. Could the reader name the largest cities in Asia? Or in China? Or what about India and Russia? It is a demanding task, which illustrates the significant potential of these new markets for future economic growth. Europe and North America will, of course, remain as essential players in the global economy; however, Asia and the Middle East will take their share. We might be on the very long cycle of getting where we were 2000 years ago. Back then, China and India had significant shares of the global GDP. However, they were mostly local economies. Much of the world was also entirely local then. These countries will have the same success story in the coming decades in the context of globalization.

What makes the world then, a “small one”? Even today, we may reach these emerging markets rather swiftly with air transport. With container shipping, products are transported rather cheaply (but take a long time). In between these, there exist hinterland transports, and the use of different transportation modes to form a complete transportation service. This will make the world seem even smaller, and people will start to see that Eurasian markets are somewhat near to each other.

This book concerns simulation as much as it concerns Eurasian economies, supply chains and intermodality. It is the most valuable asset with which the researcher can both ask the right questions and also provide some answers. Through their modelling, from time to time, using computer-based simulation, the so-called “what if” situations can be studied. This will lead to sustainable economic growth in the future.

As authors, our backgrounds are diverse and different. Yulia has taken almost all possible levels of education in Russia and lived her childhood and early adult life in the Asian part of Russia. However, for doctoral studies, she was on the European side of Russia, in St. Petersburg. After completing another doctoral dissertation on a similar topic in Finland, she eventually moved from Russia to serve at a Chinese university. It makes her perspective a little bit different from that of a pure European, Asian or North American. Olli-Pekka, in turn, was educated entirely in Finland.

Afterwards, he served for years in the universities of this country, but also worked through visiting positions in foreign universities in countries like Sweden, Estonia and China. Again, a different background, which is mostly North European. It has been a long journey for us to learn from each other. We see what the other person means and understand the starting point of the other on pending issues such as intermodal transports or related solutions to different problems that arise. This book is one trial in this process. It is joint work in its best possible manner, as we have both contributed nearly the same amount to this endeavour.

We both acknowledge the critical role of knowledge about Eurasian economies and supply chains for professionals and scholars. Therefore, the book provides a journey from an everyday theory of logistics and supply chain management (SCM) application in intermodal transportation practices to some more advanced topics, such as building your models in simulation-based decision support systems.

Chapter 1 introduces you to the challenging growth of Eurasian supply chains. It lets you know what you need to be aware of regarding their dynamics once you start researching in this direction. From this point, the chapter details potential constraints of the critical Eurasian project development, known as the One Belt and One Road (OBOR) programme. In particular, currencies are in the spotlight. Whether to blame the strengthening Chinese currency and the weakening of others in emerging economies for hindering Eurasian supply chain development in the future is a pertinent question. The end of the chapter provides the answer, as well as warns you about other uncertainties in the Belt and Road Initiative (BRI). This is not to be utterly sceptical about all of the initiatives, but instead for the reader to be a well-informed optimist once this chapter has been read.

Chapter 2 takes a look at the essential elements you need to consider when planning your supply chain in the Eurasian space. Along the way, this chapter covers the essentials of what provides the analysis and the organization of intermodal transport systems, first and foremost, logistics and SCM foundations. You will understand that the development of this scientific framework has led to a new view on the possibilities of a combination of different modes of transport. In turn, it has resulted in the evolution of a conceptual apparatus of intermodal transport. To understand a rather complicated structure of intermodal systems formed by the present time, they have been decomposed into critical elements. They include 1) transmodal and intermodal technologies of transportation; 2) critical nodal

points of intermodal traffic, such as dry ports; and 3) international transport corridors.

Chapter 3 discusses transport infrastructure mega-projects in the Eurasian space in terms of logistics and financial performance. You will get to know about the dynamics of cargo flows on recently introduced routes and learn key performance indicators of transport infrastructure operations. With just fundamental indicators, such as inventory costs and alternative costs, you can more thoughtfully compare different delivery options for a particular type of cargo. This chapter also covers the questions of risk assessment and capital budgeting. It is necessary to identify the risks of overspending in advance and take them into account in the designing phase of the investment project. The provided indicators and methods for assessing the effectiveness of the investments in the construction project seem to be reasonably and widely practised in countries where political and economic risks are perceived as high. The examples of their applications are presented at the end of the chapter. This will help take advantage of the proposed techniques.

Chapter 4 teaches you everything you need to know about the systems approach, its aspects and principles. This concept is contrasted to the classical (inductive) approach, which has its own applications. Information in this chapter is listed along with models and equations. It will make the use of these approaches in the development of your models as simple as possible. By going through the principal elements and stages of systems analysis, you will understand not only how simple systems work, but also chaotic systems, which are present everywhere. This chapter also explores the decision-making process in the dynamic world. In this type of world, things change over time. Therefore, a decision being rational today might be considered a so-called “truth of the past” by the end of the year. Finally, you will learn, for example, how pricing scenarios require an understanding of customer preferences to make the right final decision.

Chapter 5 continues to show you how to build system dynamics models, taking into account the main characteristics of dynamic systems and classifications of dynamic forecasting modelling. It also gives you a complete view of when it is best to use the system dynamics approach. At the same time, it gives an insight into how to apply other paradigms of simulation modelling, such as discrete-event, agent-based or even multi-approach modelling. By the end of the chapter, you will have a description of mixed models with the hybrid types of processes (discrete and continuous). This will immerse you further into the application of

knowledge from the earlier chapters, and their enhancement with tools for optimization and sensitivity analysis of built models.

Chapter 6 covers vital information on simulation experiments and case studies that will help you to build models by going through detailed steps, grouped into several phases. Particular attention has been paid to the design of a “test stand” for the experiment and the collection of statistics about the model of the intermodal terminal. All intermediate steps are supplied with pictures to make explicit your model development. This chapter also uses other examples of simulation modelling applications, such as the economic assessment of investments in the container terminal with the consideration of new service provision and their diffusion according to the F. Bass Theory. At the end of the chapter, network optimization experiments for defining the best locations of the bonded warehouses, supporting cross-border e-commerce development, have been provided. Afterwards, models of inventory management and case studies with key performance indicators for the human resources and internal control processes of the balanced scorecard (BSC) were reviewed.

Chapter 7 summarizes the main ideas from previous chapters and covers some critical peculiarities of a building logistics infrastructure. Specifically, these are emerging Eurasian supply chains that should not be left out as unnoticed during decision-making. On the whole, in simulation-based decision support systems, we have tried to keep models simple and less complex, while simultaneously trying to build a link to the further competitiveness of manufacturing dominated intermodal supply chains.

Last but not least, we would like to state our warm and sincere thanks for proof readers of this book, namely: Sue, Oskari, Robert and Sean. Without your kind help we would never have achieved this level of quality and precision.

Yulia Panova,
Luoyang, China

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CHAPTER ONE

INTRODUCTION

OLLI-PEKKA HILMOLA

1.1. Eurasian supply chain growth challenge

In manufacturing and trade, China is nowadays the largest actor in the world. Its progression in this regard has been consistent, as Figure 1-1 shows. In the year 2003, it was 35% smaller as an actor in trade than Germany but overtook it during the financial crisis year 2009. After that, German trade growth was mostly sideways with some small growth, while China progressed to catch the USA. China also overtook Japan to become the second-largest economy in the world only behind the United States, and its large population makes for an enormous target market. Investments from foreign companies were the most significant driver of China's growth in the decade from 2000 to 2010 (Hill and Hunt, 2018). Already in the year 2013, China was 5% higher in trade than the USA. This leadership role has remained. However, in 2016, the USA regained the most substantial trader nation status. Meanwhile, this gain was short-lived as China took the leading position back in 2017. In the following year, 2018, this situation persisted and China was 5.4% larger in overall trade as compared to the USA.

The change happened during the years 2003-2018. There has been an enormous restructuring of the economy (for a long-term review, please see Fenby, 2012). China was 58.3% below the USA in trade at the start of this period and now is somewhat above it. In the last observation year, it was a 67.2% larger trader as compared to Germany. Therefore, what China does in trade and logistics is no longer a marginal issue. Its actions are more important than previously thought, and still, its own branded goods are only moderately developed. It means that this leadership role could continue and develop further, despite many negative factors. These were mentioned in

the press to hinder this development (like the ageing population, the amount of debt and currency valuation).

On the contrary, other factors will support the country's growth. Examples would be an expansion of the middle- and upper-income categories of people (about 190 million will be in these during 2020; Hill and Hunt, 2018). They have discretionary spending, stimulating an optimistic consumption forecast for foreign companies to engage with Chinese consumers. As a result, the motivation for many foreign companies to enter China is beyond what it has been for decades. Notably, low-cost production, which became negligible compared to other developing countries due to the triple growth of the Chinese economy from 2000 to 2010 (Panova and Hilletofth, 2017; Hill and Hunt, 2018).

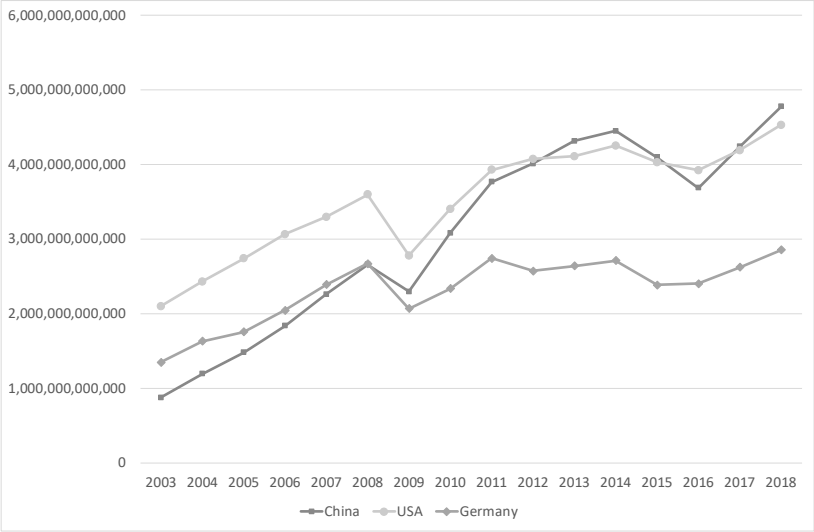

Figure 1-1. Total trade (import and export, in USD) of China, Germany, and the USA with all of the countries in the world (data source in each case, own country) during the years 2003-2018. Source (data): Comtrade (2019)

China's position as the largest trading nation could have happened in real life before the year 2013. Its overall trade volume could be much more significant today than assumed based on Chinese statistics. Partly, it is due to e-commerce. In recent years, most people in the developed economies have become acquainted with Chinese e-commerce – either directly or

indirectly. Mainly, seeing family members or neighbours ordering cheap retail items delivered directly or close to their home (e.g., a postal office). However, most of these items are such that they are neither customs registered in the receiving country, nor in China. The reason is the low price of the item, as in most cases it is lower than a required customs registration limit for import tariffs.

Even if these parcels seem to look like the innocent and beneficial part of globalization, their impact on trade volumes cannot be underestimated. Hongfei (2017) argues that the total amount of China's cross-border e-commerce was in 2016 around 6.66 trillion yuan, and most of this trade was exports (83.1% in the year 2015). Cross-border e-commerce is also growing significantly all the time. It could only be guessed, to what extent this 6.66 trillion yuan (around 1 trillion USD with 2016 currency rates) was recorded in official trade statistics. Some part of e-commerce is business-to-business, where this is a must, and also in more expensive consumer orders. However, if 50% was not registered, then there was around 13.6% of non-registered trade, benefitting China (as compared to 2016 trade data).

Apart from the e-commerce phenomenon, additional facts were found based on a more in-depth and further examination of the trade statistics of Comtrade (2019). That is, German imports from China were on average 50% higher in the period 2008-2017 than the figures China is reporting as Chinese exports to Germany. The situation is similar in USA imports, which from China are reported on average to be nearly 30% higher in comparison to reported Chinese exports to the USA (in the same period, 2008-2017). Similar findings were reported in the study of Eriksson et al. (2013), and Shaar & Baharumshah (2016). Also, Day (2015) found differences, but emphasized that the kinds of differences existing depend on the country/region. In the case of Asian countries, it is typical for their exports to China to be much lower as compared to the claims of the Chinese import statistics. A similar difference in Chinese imports is present in USA exports (Shaar & Baharumshah, 2016).

Understandably, countries' trade statistics do not match each other. The imports of country A from country B do not equal the exports of country B to country A. This is due to delays in logistics and the delivery process as then imports could fall into the statistics of another year. Occasionally, transportation costs differ in the way they are included in import prices. Possible customs tariffs along the way (a third party used in the export process, like Hong Kong or Singapore) are yet another differing factor in import prices (as other delivery related costs). Finally, currencies change

significantly during the delivery process. However, all in all, these possible causes of disparity between trade numbers should and could not be 30-50% (in reality, they ought to be well below 10%).

Differences could be explained by trading practices, where manufactured goods on the journey from China to the west change ownership once or several times during the trip (e.g., in Hong Kong; Shaar & Baharumshah, 2016). These changes take place most often due to taxation reasons (value-added tax, and profit tax of corporations). Prices and imported codes may change during the journey, too (Shaar & Baharumshah, 2016). However, this last mentioned and fraudulent activity is not the main reason (to enable lower customs tariffs in the country of destination). As a conclusion, it could be stated that China is currently, for sure, the largest trading nation in the world. There is a high possibility that it is much larger than the second position country, the USA.

China's manufactured products also probably have a higher value (price) as intermediaries can charge on the way to the final destination. Day (2015) emphasized that this depends on currency directions (USD vs. yuan). Notably, that is whether Hong Kong re-export is used to increase prices or if higher prices are charged to mainland companies in the case of a strengthening yuan. The current overall trade gap of the USA could be more extensive than what it is argued to be, possibly over 20% higher. Therefore, China's role in the real-world supply chains is far more significant than "official" statistics tell. Even if the final product is argued to be manufactured in the west, it does not necessarily mean that most of its content is from that region. A supplier network under cost pressure could, increasingly, use offshoring and low-cost production in sub-assemblies. At the same time, the supplier may order sub-assemblies through "middlemen" located, e.g., in Hong Kong or Singapore, which in turn use Chinese workshops.

The role of Hong Kong, and parts of Singapore, cannot be under-emphasized in the future development of Eurasian supply chains. Based on official Chinese statistics, the average trade with Hong Kong was 294.5 bn. USD per annum during the years 2008-2017. This trade was mostly represented by imports from China to Hong Kong. If compared to the volume of larger trading countries of China, it is in the neighbourhood of Japanese trade. So, this highlights the importance of Hong Kong in the future development of any supply chains in China. Specifically, one city area of slightly above seven million inhabitants has the same relevance as well-developed and industrialized Japan.

In official customs statistics, half of the massive Hong Kong and China trade is re-exported further. Hong Kong is not the only trading hub related to China, but it has traditionally been the source of foreign direct investments to Chinese manufacturing (Naubahar & Tseng, 2011). Singapore had an average trade of 67.5 billion USD with China in the same period. Re-export statistics are not available from Singapore (also concluded in Day, 2015). Singaporean trade during the period 2008-2017 was at the level of Chinese trade with India or Russia. Singapore has a population somewhat above five million. Purely due to business practice reasons, changes in the investment trend could be expected. Notably, future investments in infrastructure are made so that these two trading hubs (Hong Kong and Singapore) will be supported further. In other words, the prosperity and success of these flows are somehow assured. This not only means investments in sea ports and maritime supply chains, but also to connect these places much better with railways, air, and other hinterland modes. Based on the recent empirical study of Lee et al. (2018), Hong Kong and Singapore still have a competitive edge in the sea port-centric logistics as compared to Busan or Shanghai. For further trade-development analysis, between 2008 and 2018, additionally, some of the most critical Asian as well as North European countries were selected. Among these countries, average trade growth in this period with China was above 60%, and many countries showed a growth level higher than this (Figures 1-2 and 1-3).

Indian trade grew by 115.9%, while Pakistani trade, in turn, recorded the highest growth, 202.0%. Trade between the USA and China increased by 62.2%. Meanwhile, German trade was able to grow by 73.3%. Mainly growing over the last years, Russian and Chinese trade showed even higher growth than these two at 93.6%. From the smaller trading countries analyzed in Figure 1-3, Poland, Latvia, Estonia, and Belarus need to be mentioned as they showed growth within the range of 72-94.7%.

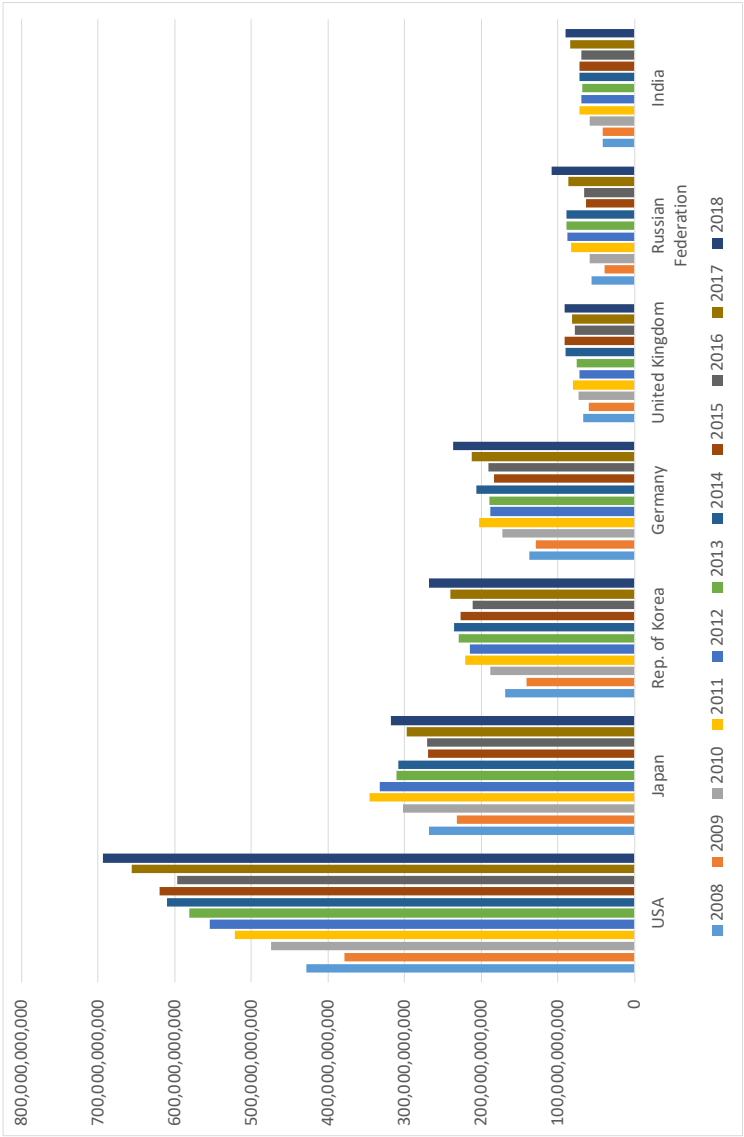

Figure 1-2. Chinese trade (import and export) with the seven largest countries in the group selected (in USD; data source each country in the figure). Source data: Comtrade (2019)

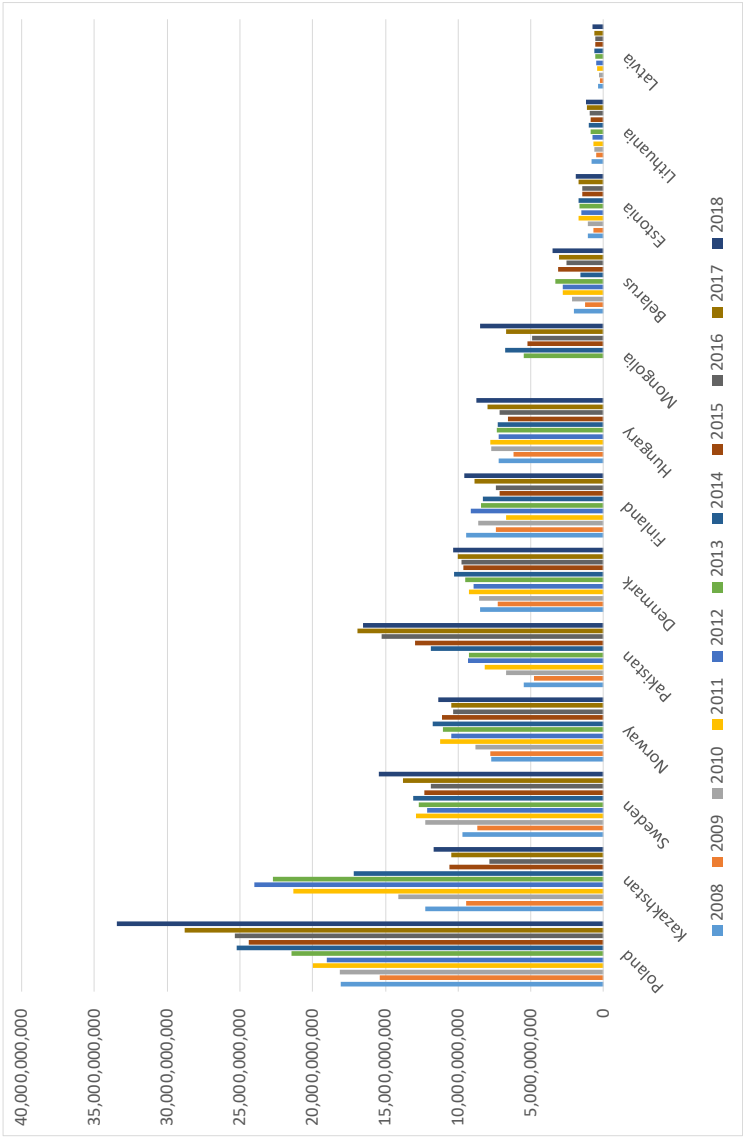

Figure 1-3. Chinese trade (import and export) with the remaining thirteen countries in the group (in USD; data source each country in the figure). Source data: Comtrade (2019)

The only exceptions to overall Chinese trade growth were Kazakhstan and Finland. Both have experienced a no-growth period in trade (actually Kazakh trade with China showed a decline of 4.5%). It should be emphasized that volumes of trade are of course in the hands of very few. The USA had trade with China worth 693.9 billion USD in 2018, and this was a 15.7% lower amount than the following three countries combined (Japan, Republic of Korea and Germany). Figures 1-2 and 1-3 do not contain European Union countries' total trade with China. In some years this has been even higher than USA trade (e.g. 2008-2011; e.g., Hilmola, 2014). Yet in the most recent years (2015-2017), the USA has retaken the lead. However, in the last foreign trade data year, the EU-28's trade with China is again a little bit larger. These changes can mostly be explained by the strengthening of the dollar (positive for USA-China trade) and the growing USA economy (again positive for USA-China trade), but are also due to trade disputes (harmful for USA-China trade).

In the next Figures 1-4 and 1-5, Chinese trade is observed from the angle of counters that are considered to be the most important export markets of the country. Both Japan and the Republic of Korea exported more in 2017-2018 than the USA. The Korean performance has been consistently reliable and outperforming the USA in the entire observation period. Meanwhile, a Japanese export peak was experienced in 2011 (this was probably due to a dispute and anti-Japanese demonstrations in China during 2012). Moreover, in some years its exports have been lower than those of the USA (2015-2016). However, there was an evident recovery in Japanese exports in the last observation years. In 2018, the Republic of Korea was the largest exporter to China in the entire world.

It should be remembered that from 2008 through to 2018 export growth to China has been active, and in the countries of Figures 1-4 and 1-5, it has been on average somewhat above 140%. The highest export growth could be found from small countries such as three Baltic States (Estonia, Latvia, and Lithuania). Their growth has been from somewhat below 200% to nearly 700% in the period. Other high growth countries (having around 100% improvement) have been Germany, United Kingdom, Russia, Pakistan, Poland, Hungary and Sweden. USA based Chinese exports grew by 68.1%. In this light, it is understandable why European countries are part of the Asian Infrastructure Investment Bank. At the same time, it is clear why the Belt and Road Initiative (BRI) includes Central and Eastern Europe as one of its infrastructure spending areas. Also, the role of Pakistan and India should not be underestimated in the BRI. However, challenges remain as most of the countries in Figures 1-4 and 1-5 are suffering from trade deficits

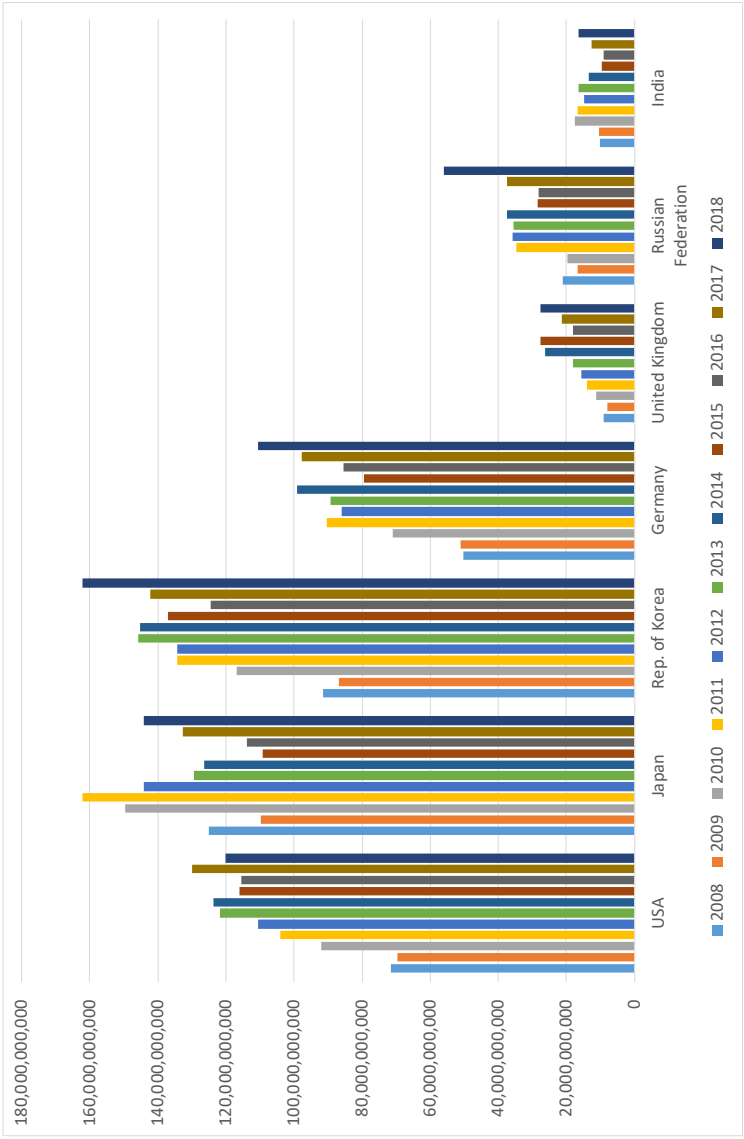

Figure 1-4. Exports to China from a selected group of countries, concerning the seven largest (in USD; data source each country in the figure). Source data: Comtrade (2019)

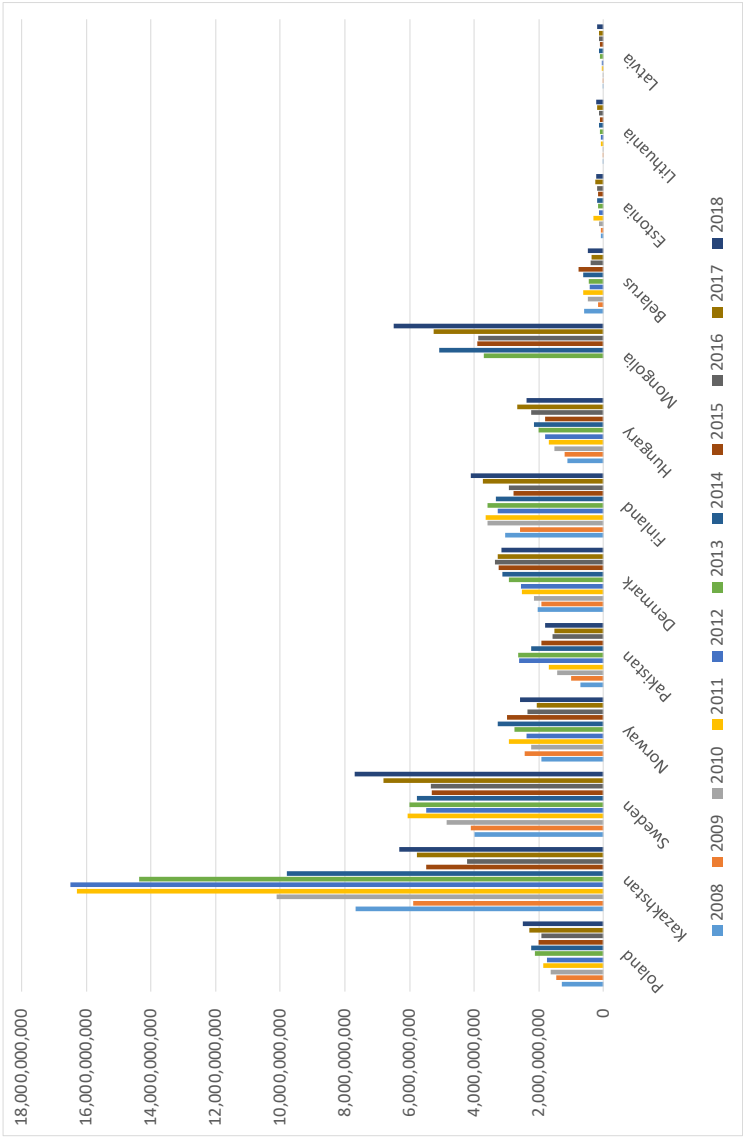

Figure 1-5. Exports to China from a selected group of countries, concerning the remaining thirteen countries (in USD; data source each country in the figure). Source data: Comtrade (2019)

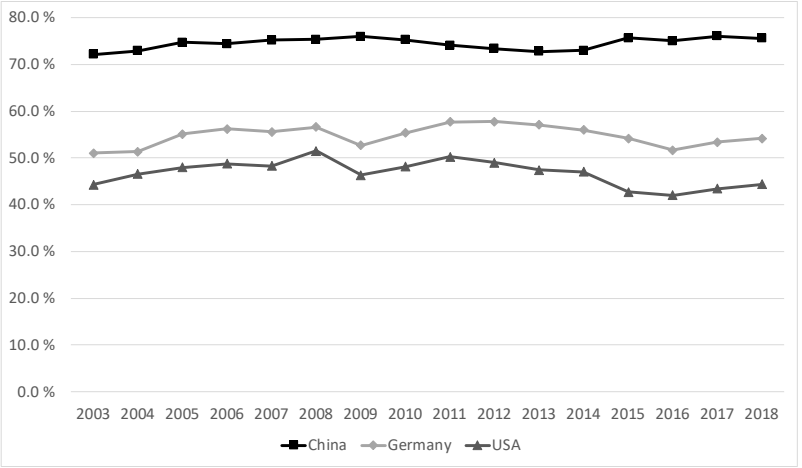

Figure 1-6. Share of intermediates from overall imports in China, Germany and the USA during the years 2003-2018. Source data: Comtrade (2019)

(especially European countries, like Poland, where deficits are abnormally high; see Chorość-Mrozowska, 2019), and in 2018 only South Korea, Mongolia, Russia and Kazakhstan showed a surplus within Chinese trade.

To further understand the practices of Chinese world trade, it is vital to examine its different imports compared to two other big trading nations. These are the USA and Germany, see Figure 1-6. For this purpose, China was in Comtrade (2019), examined through the BEC classification (Broad Economic Categories). From there, we took the sum of all sub-classes considered to belong to "intermediate" products (based on the guidance of the United Nations, 2018). It is interesting to note that still, China is mostly importing raw materials and semi-finished products ("intermediates"), while Germany and the USA have a larger share of other products such as "consumption" and "capital" goods.

Meanwhile, the United States is relatively abundant in capital compared to other nations. Therefore, according to the Heckscher-Ohlin theory, the country should be an exporter of capital-intensive goods. At the same time, the country has to be an importer of labour-intensive goods (Hill and Hult, 2018). However, in practice, a paradox may be identified, and it was found for the first time by Wassily Leontief (winner of the Nobel Prize in economics in 1973). This result (US exports were less capital-intensive than

US imports) was at variance with the predictions of the theory, and it has become known as the Leontief paradox. No one is quite sure why the Leontief paradox is present. Hill and Hult (2018) state that one possible explanation is that the United States has a unique advantage in producing and introducing new products or goods made with innovative technologies. Such products may be less capital-intensive than products whose technology has had time to mature and become suitable for mass production.

Chinese imports of consumer goods are still very low, and in proportional terms, the USA and Germany import four to five times more. In trade statistics, most intermediate goods imported to China are within the classes of "industrial supplies not elsewhere specified" (where the sub-class of "processed" is more extensive than that of "primary") as well as "fuels and lubricants" (raw material sourcing strategy is described in detail within Moyo, 2012). This only illustrates further that China is well-positioned in global supply chains, and it has much value-adding activity in its own hands. It is not shown here, but Chinese exports of "intermediate" products are only somewhat above 40% (in the USA and Germany, this share is higher, but not significantly). Therefore, export items are mostly "capital" and "consumption" goods with higher prices – nowadays they both have significant size, and China exports both in proportionally high amounts. In comparison within the USA and Germany, export activity is more about "capital" goods rather than the consumption sector.

The role of intermediate goods in imports is not exceptional in China. A similar structure is present in other Asian countries such as South Korea, Vietnam and Japan. Figure 1-7 illustrates this further. It is interesting to note that South Korea is basically at the same proportional level with China, if the last three years of the observation period are not taken into account. However, its economy has a much higher GDP per capita. It could also be assumed that the consumer economy in South Korea is much more developed. Vietnam has followed the Chinese economic model in recent years, and has considerably increased its share of intermediates in imports; an indicator that this country is increasingly having a foothold in global supply chains. It also has the same low level of intermediates in exports. Japan is, of course, the most developed in terms of GDP among these countries, but still, its intermediate share of imports is higher than similar peers, the USA and Germany. These characteristics are just one additional learning point in Eurasian supply chains. Notably, much country-level manufacturing is present, and therefore imports are mostly raw materials or semi-finished items. It is different from the old west. Based on this, it could

be stated that for exporters, the Asian consumer market is challenging and stressful.

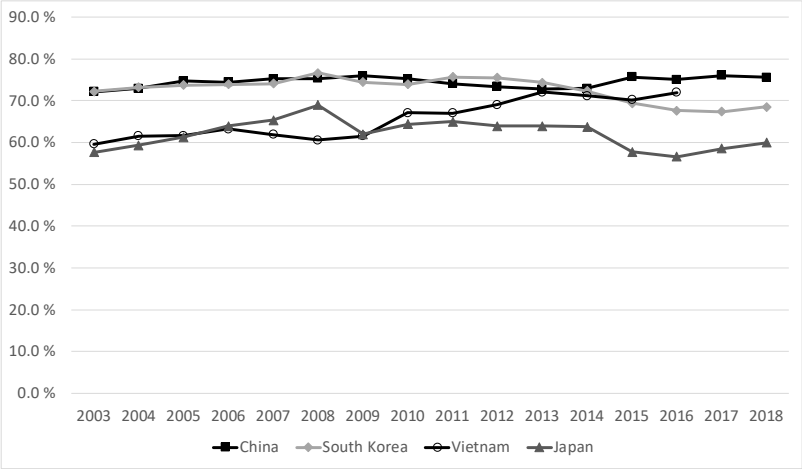

Figure 1-7. The share of intermediates from overall imports in China, South Korea, Vietnam and Japan during the years 2003-2018 (the years 2017-2018 have data missing from Vietnam). Source data: Comtrade (2019)

In many respects, China is similar to the USA. For example, the geographical size of the country is quite similar to that of the USA (the latter is only a little bit larger). The route to its prosperity is also reminiscent; particularly, with the USA's world dominance in manufacturing during the 20th century. In transportation and logistics, China is repeating the same dependency process on road transport, which happened earlier in the USA and Europe. In the late 1970s, the primary Chinese transportation mode domestically was the railway (Figure 1-8) as its share was 53.8%. It was, of course, typical for a centrally planned as well as closed economy, to tie itself around the railway. However, during the decades of economic opening and progress, waterways and primarily road transports prospered. At the same time, the railways were almost annually losing their market share.

Based on official statistics, the railway modal share from freight transports was 13.7% in 2017. This corresponds to around a 40%-point drop (absolute) in approximately four decades. In the same period, road transports grew from 3.5% to 33.8% (a nearly ten-times-higher modal share!). On the positive side during this period, the waterway modal share also increased,

but rather conservatively from 38.3% to 50.0%. A quite significant part of this growth in waterways was due to coastal (ocean) transports. In Figure 8, changes are illustrated with the measure of ton-km, and this favours railways and other long-distance transportation modes.

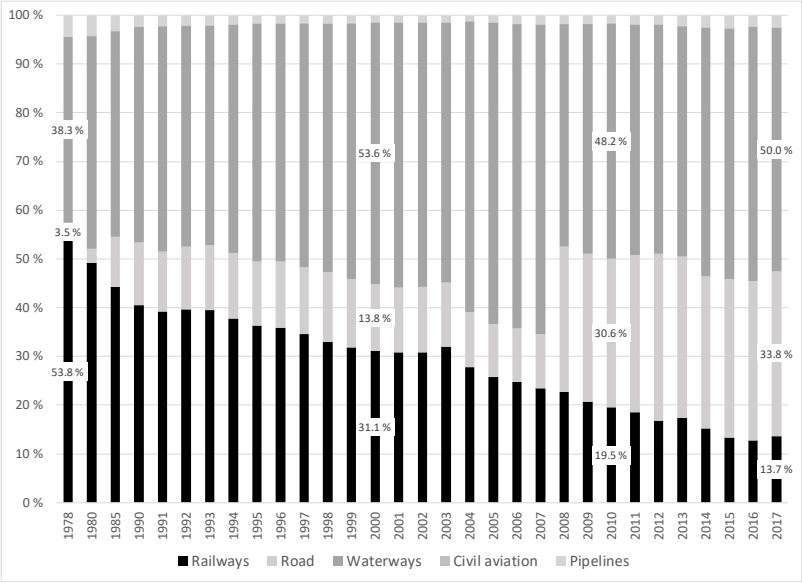

Figure 1-8. Freight transportation modes in China during the years 1978-2017 (in ton-km). Source (data): National Bureau of Statistics of China (2018)

If tons were used as a measure, then road transport dominance would be immense. In 2017, its modal share in tons was 76.7% (followed by 13.9% waterways, and 7.7% railways). Why then were railway transports unable to respond to the opening and increasingly international economy of China? Most of the growth took place by the coast and in coastal areas, and the hinterland had a secondary role. The volume of the largest Chinese container sea port is the illustration from this container-based system development. Also, the largest in the world in 2016 (United Nations, 2001 & 2017), Shanghai, during the year 2000, handled 5.6 m TEU containers. As of the year 2016, this had increased to 37.1 m TEU (+31.5 m TEU or +562.5%).

Also, sea transports for exports were dominant. At the same time, containers prospered significantly. It could be said that Chinese logistics innovation

was an adaptation and use of containers and intermodal transports in supply chains. Similarly, the just-in-time system was first employed at a large scale by the Japanese (however, both of these have origins in the USA). In the coastal centric system, it is much preferable for transport tasks that are flexible and prompt at short distance to use road transport, instead of railways. It is also typically cost-competitive in short-to-medium-distance transport tasks. Road transportation capacity (infrastructure investments, but also actor entry to a business) is also much easier to expand as compared to railways.

In China, the strength of the railway system relies on passenger transport. A significant amount of new investment has been made in the railway network, rolling stock and serving infrastructure (e.g., stations). This is primarily the situation with the high-speed railway as approximately 40% of the overall passenger volume (whether it is in the number of passengers or passenger-km) uses these modern and state-of-the-art trains. A similar stronghold is in civil aviation, where passengers using air transports have increased tremendously. In 2017, the modal share of railways in passenger-km was 41%, followed by 30% for road transports and 29% for air transports. In future, it is an open question, how much additional freight volume the railway system can handle in China as the focus has been on passengers. At least, based on the plan up to 2030, the high-speed railway network continues to expand, and this will affect the central and western parts of China (Xu et al., 2018).

The significant downside of using road transport on a large scale, within domestic freight transports, is the building up of structural dependence on foreign oil imports. Of course, China has its own oil reserves and oil production. However, in the two last decades, these have not been able to grow along with consumption. Domestic production has slowly started to decline as, after the peak production of 2015, volumes have declined by 10.7% in two years. Interestingly, in 2014, China had a higher deficit than the USA in the oil trade (if estimated based on BP's 2018 data). The deficit only enlarged after that, and consumption in the domestic market, in turn, has increased. Consumption growth could also be noticed in the imports of natural gas. As a result, China is nowadays importing more natural gas than Japan, a country which was earlier the world's leading importer. Aizhu & Meng (2019) report that China has plans to increase the domestic drilling and production of gas to suppress import growth. Based on BP's (2018) data growth trajectory of gas consumption in China, it was very steep in the last decade. Moreover, both domestic production and imports are needed in increasing amounts in the future.

Even if it is a widely discussed issue that China has trade surpluses, these could continue to shrink. Especially if the oil-hungry economy does not consume less energy. One way to achieve this is to produce higher value-added products, and leave lower and higher polluting bulk manufacturing to others. The situation is pretty much the same elsewhere in the Asia-Pacific, especially in economies which are repeating the export-based growth model of China.

1.2. Currencies in the spotlight in emerging economies

The world turned to a fiat currency system at the end of the Bretton Woods system (effective during the years 1944-1971). Since late 1971, all world currencies have just been paper and a tremendous governmental promise as well as the guarantee from sound money and economic stability. Therefore, it has not been that surprising to identify, from time to time, crisis periods emerging in this system. Specifically, when some weaker economies face massive devaluation and a country's ability to serve foreign financial engagements significantly erodes. Economics books typically analyze the Asian and Russian currency crisis. From 1997-1998, it led to severe trouble in world trade, and finance. Banks, as well as central banks, were eventually forced to save the system (by mergers and bailouts). The same situation took place again in the 2008-2009 financial crisis. The US dollar was also depreciating significantly. Notably, in early 2000 one euro was worth somewhat above 0.8 USD, while in late 2008 one euro appreciated up to nearly 1.6 USD.

However, fiat currencies have been most harmful for emerging countries in trouble. Everyone knows the story of Zimbabwe's dollar from the previous decade, and most recently the similar rapid depreciation and hyperinflation experience of Venezuela. In the situation of hyperinflation, economies are barely able to benefit from depreciating currencies in terms of export growth opportunities. The reason is that no one trusts the currency and the economy more or less slows down. However, gradually over time, managed devaluations have been the secret weapon of many countries. Specifically, they were even used previously in currently wealthy EU countries in the pre-euro era to claw back manufacturing competitiveness.

There are many examples of successful yet currency-depreciating emerging economies. Take China as one. In the early 1980s one USD was worth around 1.5 Chinese yuan. However, it was depreciated so that, in the following decade time period, one USD was just below nine yuan (8.73 yuan per USD was the lowest value). It was not a great surprise to see that

manufacturing-based export prospered significantly in the 1990s as the weak yuan policy was supported by the USA and China together until July 2005. After that, the world experienced a slightly appreciating yuan, but only modestly. There was even the situation, where the yuan was approved to be part of the world's elite currencies (from October 2016 onwards). Now it is one of the five currencies, the others being the pound, dollar, euro, and yen, forming daily Special Drawing Rights (SDR) of the International Monetary Fund (IMF). During 2018 the Chinese yuan was depreciating again (appreciation ended in 2014), and it was trading in the area of 6.8 yuan to one USD in the late summer of 2018. This means that from the lowest value of 1994 (8.73) the yuan has only appreciated by some 20%. The yuan is still weak in the long-term perspective and gives a competitive advantage for manufacturing export.

There are numerous other Asian countries which have built their economic success on a weak currency policy. For example, after the Second World War, Japan was tied to the USD with 360 yen. The weak currency continued until the Plaza Accord of September 1985 (agreement between the USA and different leading industrialized countries to weaken the USD in the forthcoming years). During the mid-1980s one USD was worth around 250 yen, but a decade later, it was approaching the level of 100 yen. It is not surprising to see that Japanese GDP growth also disappeared during this change, and the economy has been in trouble for decades. However, still, the yen has kept its strength against the USD.

A similar story could be told about South Korea, a country that was in the eye of the currency crisis in 1997-1998. Before the crisis, the South Korean won was valued so that one USD was worth around 800 won (even below 700 was recorded in the late 1980s). During the currency crisis period, the won declined significantly as nearly 2000 won were worth one USD. After this, the won has remained in the area of 1000-1400 won to the USD. The crisis also provided the opportunity for manufacturing-based export to grow, and its growth trajectory has been steep in South Korea since the early 2000s. The case is pretty much the same in Thailand and Indonesia; two other Asian countries that were hard hit by the currency crisis of 1997-1998.

What do currency devaluations of the past and the emerging economy's currency valuation weakness have to do with the One Belt and One Road (OBOR) programme as well as Eurasian supply chains? There is quite a lot of dependence, if the examination focus is switched from the short term to the medium and long term. There is still considerable debate all over the world about the Chinese currency and the need for it to appreciate in the

following decades. For the Chinese domestic economy, it is also becoming increasingly important to have a stable currency. The reason for this, is that the country is importing increasing amounts of raw materials (e.g., oil, coal and gas), which are traded in USD. The weak currency would make life difficult for energy-hungry industries and a country undergoing change to become increasingly road transport dependent. A strengthening yuan will, of course, be difficult for manufacturers to absorb. However, their competitiveness has already been so significant in the world market, that Chinese manufacturing dominance will hold. Meanwhile, it is not yet necessary to grow that much in volume. Notably, it is not so, if compared with Japan during the transition from the 1980s to the 1990s and beyond.

China is also massively funding the OBOR programme and different investments in other emerging countries, and these debts are most probably yuan- or USD-based. It is a problematic part of the OBOR programme in the 2020s. Many investments in smaller emerging countries are taking a massive proportion of their economic assets and GDP. This is why even small changes in the number of loans would make their life very difficult (e.g., in the case of an appreciating yuan). Some initiated projects could face difficulties in execution due to this. Moreover, they can even be cancelled before they are even finalized. Examples of this are already present. For instance, Sri Lanka, which faced difficulties due to too large-scale (more than eight billion USD) Chinese investments (Schultz, 2017). Another example is African countries which have also gone to high debt levels due to infrastructure projects, and these are continuously increasing in scale (Sun, 2014).

As a result, these processes and projects have led to awkward situations. Notably, sea port concession contracts have been awarded in turn to Chinese companies (e.g., Hambantota in Sri Lanka, and Djibouti in Africa). Many countries have also frozen some of the ambitious projects of OBOR that were to be implemented. Examples are Malaysia, and also parts of Thailand, where projects have experienced delays. Mostly, it is due to the fear of not being able to serve loans in the future (Reuters, 2017 & 2018). A strengthening yuan, loans given in this currency and currencies of weak emerging economies are the combination which severely hinders Eurasian supply chain development in the future. This was already present in the earlier African investments of China, where the country was forced to forgive some of its loans (Moyo, 2012).

Which currencies have then depreciated in Asia in the last two decades? The biggest hope and promise for future growth in this geographical territory is